field that is substantially parallel to the surface of the substrate support, the annular magnet array being concentrically positioned about the surface of the substrate support.

15. (Amended) A method for depositing a magnetic film within a sputtering chamber containing a target and a substrate, comprising:

sputtering the target onto a surface of the substrate at a pressure less than about 15 mTorr;

collimating sputtering of the target with a grounded collimator disposed between the target and the substrate; and

generating a [stationary] magnetic field that is substantially parallel to the surface of the substrate during sputtering using an annular magnet array concentrically disposed about the surface of the substrate within the sputtering chamber.

REMARKS

This Response is intended as a full, complete, and timely response to the Office Action dated October 17, 2000, having a shortened statutory period for response set to expire on January 17, 2001. In response to the Office Action, Applicants respectfully request entry and consideration of the above noted amendments and the following remarks.

Claims 1 and 15 have been amended, however, no new matter has been added to the application, and therefore, claims 1-3, 5, 15, 16, and 18-20 are respectfully submitted for consideration.

Claims 1-3, 5, 15, 16, and 18-20 stand rejected under 35 U.S.C. § 112. In particular, the Examiner stated that the phrase "stationary magnetic field" in claims 1 and 15 lacked literal and/or illustrative support in Applicants specification. Although Applicants contend that a stationary magnetic field is supported by the combination of the written specification and the drawings of the present application, Applicants have removed the term "stationary" from the pending claims via the above noted amendments.

Claim 1 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tepman* (U.S. Patent No. 5,380,414). The Examiner stated that *Tepman* teaches a chamber having a target and a substrate therein where the target and the substrate are separated by a particular distance. A collimator that is reasonably presumed to be grounded is positioned between the

target and the substrate and a magnet array 11 is positioned within the chamber. The Examiner stated that it may be assumed from column 5, lines 23 - 28 that the magnet array 11 provides a magnetic field at the surface of the substrate. Further, the Examiner stated that the magnetic field generated by the magnet array 11 may be reasonably presumed to be substantially parallel to the surface of the substrate, as magnetic field lines are known to conform with the shape of an intervening surface. Applicants traverse this rejection and respectfully submit that *Tepman* fails to teach and or otherwise illustrate each and every limitation presented in claim 1.

With particularity, claim 1 recites an apparatus for depositing a magnetic film having a sputtering chamber containing a target, a substrate support having a surface that is separated from the target, and a grounded collimator positioned between the target and the substrate support. Further, an annular magnet array for forming a magnetic field that is substantially parallel to the surface of the substrate is positioned within the chamber concentrically about the surface of the substrate support. Although *Tepman* appears to teach a chamber, a target, and a substrate support, *Tepman* plainly fails to teach an "annular magnet array" that is "concentrically positioned about the surface of the substrate support" for the purpose of generating a magnetic field that is "substantially parallel to the surface of the substrate support," as expressly recited in claim 1.

The Examiner has concluded that magnetic array 11 of *Tepman* may be presumed to generate field lines that are substantially parallel to the surface of the substrate, however, a careful reading of *Tepman* provides no support for such a conclusion given the structure and shape of magnet array 11. Applicant's magnet array is annular, and therefore, generates field lines projecting inwardly toward the axis of the annular magnet. Since the magnet array is concentrically positioned about the substrate, these field lines are inherently substantially parallel to the substrate surface. Magnet array 11 of *Tepman* is described as being "U-shaped," as shown in Figure 3, and is positioned below the substrate and the substrate support member. Although *Tepman* lacks any teaching whatsoever of the direction of the field lines from magnet array 11, the Examiner indicates that the field lines from the U-shaped magnet positioned below the substrate and substrate support "are known to conform to the shape of an intervening surface," and therefore, would be parallel to the surface of the substrate. Applicants disagree and respectfully submit that if the field lines of the U-shaped magnet in fact conform to the shape of

intervening objects, then the field lines would likely remain below the substrate support (the intervening object) and not be proximate and/or parallel to the substrate surface. Further still, in order for the magnetic field lines of magnetic array 11 in *Tepman* to be parallel to the substrate surface, these field lines would have to pass through the plane of the surface of the substrate, as magnetic array 11 is positioned below the substrate. Inasmuch as parallel lines are generally defined and accepted to be those lines that do not intersect, the field lines of *Tepman* are clearly not parallel to the substrate surface as a result of the intersection therewith. Therefore, in view of these differences, Applicants respectfully submit that claim 1 recites elements and/or limitations that are neither disclosed, taught, nor otherwise suggested by *Tepman*. As such, reconsideration of the rejection of claim 1 under 35 U.S.C. § 103 over *Tepman* is respectfully requested.

Claims 1 and 2 were rejected under 35 U.S.C. § 103(a) over *Tepman* as discussed above, further in view of *Hsu* (U.S. Patent No. 5,589,039). The Examiner stated *Hsu* teaches sputtering a magnetic material, and therefore, in view of *Tepman*, the Examiner concluded that each and every element of claims 1 and 2 was disclosed by the combination of references. Applicants traverse this rejection and respectfully submit that claim 1, and therefore dependant claim 2, recites subject matter that is neither disclosed, taught, nor otherwise suggested by the cited combination of references.

Hsu appears to teach a biasing magnet structure for producing a parallel magnetic field that extends parallel to a substrate on which a magnetic thin film is deposited. The target material is expressly recited as being manufactured from a magnetic material. However, *Hsu* does not teach the use of an annular magnet structure positioned concentrically about the substrate in order to generate a field that is substantially parallel to the substrate surface. Although the Examiner cites to column 1, lines 43 - 52 as teaching a magnetic field that is substantially parallel to a substrate, lines 43 - 52 are wholly unrelated to generation of a magnetic field that is parallel to a substrate surface. Rather, lines 43 - 52 of *Hsu* pertain to the alignment of the domains of a magnetic material in a GMR-type read head with the magnetic fields being sensed on a disc-type medium having data stored thereon via magnetic fields. Therefore, lines 43 - 52 are completely unrelated to generating a magnetic field parallel to a substrate surface while depositing a film thereon. Further, *Hsu* does not teach the use of a grounded collimator. Therefore, Applicants submit that *Hsu* fails to further the teaching of *Tepman* to the level

necessary to support a rejection of claims 1 and 2 under 35 U.S.C. § 103, as the combination of references fails to teach, disclose, or otherwise suggest the combination of elements expressly recited in claims 1 and 2. Therefore, reconsideration of the rejection of claims 1 and 2 under 35 U.S.C. § 103 over *Tepman* and *Hsu* is respectfully requested.

Claims 3, 5, and 6 stand rejected under 35 U.S.C. § 103(a) over *Tepman* and *Hsu* as discussed above with regard to claim 2, further in view of *Boys* (U.S. Patent No. 4,500,409) and Applicants admitted prior art. Applicants traverse this rejection and respectfully submit that the combination of references fails to teach, disclose, or otherwise suggest the elements and/or limitation of claims 3, 5, and 6, all of which depend from claim 1.

Although *Boys* appears to teach a sputtering apparatus for sputtering a Permalloy target wherein the distance from the target to the substrate is 2.5 inches (63.5 mm), *Boys* is nonetheless absent any teaching of an annular magnet array being concentrically positioned about the substrate in order to generate a magnetic field that is substantially parallel to the substrate surface, as recited in claim 1. Therefore, in view of the fact that claims 3, 5, and 6 depend from claim 1, Applicants submit that *Boys* fails to further the teaching of *Tepman* and *Hsu* to the level necessary to support a rejection of claims 3, 5, and 6 under 35 U.S.C. § 103.

Claims 15, 16, and 18 - 20 stand rejected under 35 U.S.C. § 103(a) over *Alex* (U.S. Patent No. 5,616,218) in view of *Boys* and *Tepman* as discussed above. The Examiner took the position the *Alex* teaches a collimator positioned between a substrate and a target, wherein the collimator is presumed to be grounded. Although *Alex* doesn't expressly teach a pressure of less than about 5mTorr and a distance from target to substrate of about 50mm, *Boys* is cited to teach a pressure of 4mTorr and a distance of 63.5mm. Therefore, the Examiner concluded that it would have been obvious to implement a method utilizing a pressure of 5mTorr and a distance of at least 50mm. Applicants traverse this rejection and respectfully submit that claim 15 recites method steps not disclosed or suggested by the cited combination of references.

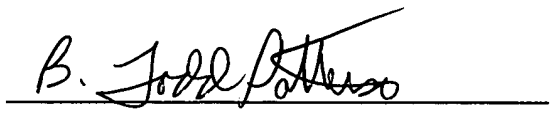
Alex appears to teach a method for selectively choosing the magnetic properties of a recording layer that is deposited via a sputtering process. The method includes collimating during the sputtering process of a metal underlayer and then depositing a magnetic film upon the under layer. However, *Alex* does not teach grounding the collimator. Further, *Alex* does not include the step of generating a magnetic field that is substantially parallel to the substrate

surface via an annular magnetic array. Since both of these limitations are expressly recited in claim 15, Applicants respectfully submit that claim 15, along with dependant claims 18 - 20, recite subject matter that is neither disclosed, taught, nor otherwise suggested by the cited combination of prior art references. Therefore, reconsideration of the rejection of claims 15, 16, and 18 - 20 under 35 U.S.C. § 103(a) is respectfully requested.

In conclusion, Applicants respectfully submit that the references cited by the Examiner, neither alone nor in combination, teach, show, or otherwise suggest the apparatus and/or method of the present invention. Having addressed all issues set out in the office action, Applicants respectfully submit that claims 1 - 3, 5, 15, 16, 18 - 20 are in condition for allowance. If for any reason the Examiner determines that the claims are not allowable, the Examiner is requested to contact the undersigned attorney at the telephone number listed below to arrange for an interview to expedite the disposition of this application.

The prior art made of record is noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary references cited in the office action. Therefore, it is believed that a detailed discussion of the secondary references is not deemed necessary for a full and complete response to this office action. Accordingly, allowance of the claims is respectfully requested.

Respectfully submitted,



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